Bitterroot Elk Project Progress Report

Fall 2011

Elk populations in the Bitterroot Valley in western Montana have been monitored since the mid-1960's. From the mid-1960s until 2003, elk numbers steadily increased. In 2004, Montana Fish, Wildlife, and Parks (MFWP) increased antlerless harvests to reduce elk population numbers toward management objective. However, since 2004 cow:calf ratios have declined throughout the Valley, including a valley-wide historic low in elk calf recruitment in 2009 (Figure 1). Low recruitment and population declines have raised concerns that the increasing number of wolves may be reducing elk populations and hunter opportunities in the Bitterroot Valley. While basic factors like density-dependence may decrease recruitment rates, recent declines in elk counts and increasing wolf populations suggest predation may be playing a role. The relative effects of bottom-up and top-down influences on elk populations and recruitment are unknown, making implementation of effective management actions difficult.

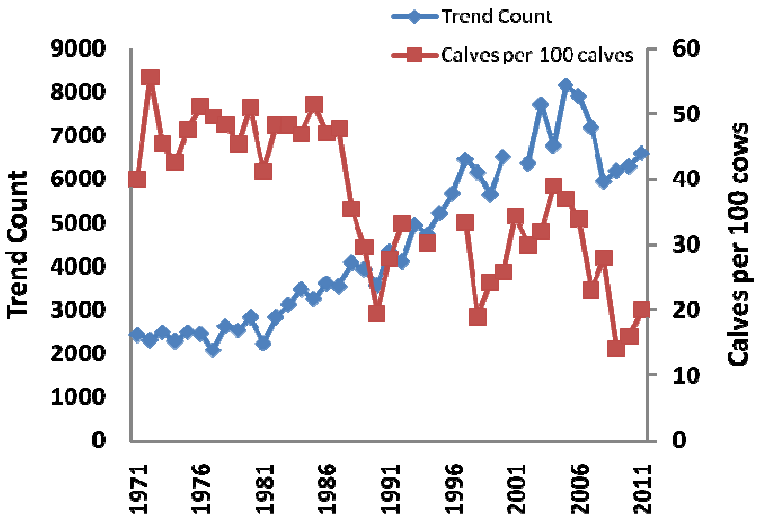

Figure 1. Elk trend counts and number of calves per 100 cows in the Bitterroot Valley from 1971-2011.

During the winter of 2010 - 2011, MFWP and the University of Montana initiated a project investigating elk survival and recruitment in the East Fork and West Fork elk herds in the Bitterroot Valley of western Montana. The purpose of the project is to investigate the relative effects of maternal nutritional condition and predation on elk productivity, survival, and recruitment. The probability of sustaining pregnancy, over-winter survival, and lactation yields are related to maternal nutritional conditional. Further, predation may limit elk populations when high predator prey ratios are reached. Our objectives are to 1) Estimate maternal body condition, pregnancy rates, and survival rates, and 2) Evaluate factors affecting calf survival and recruitment.

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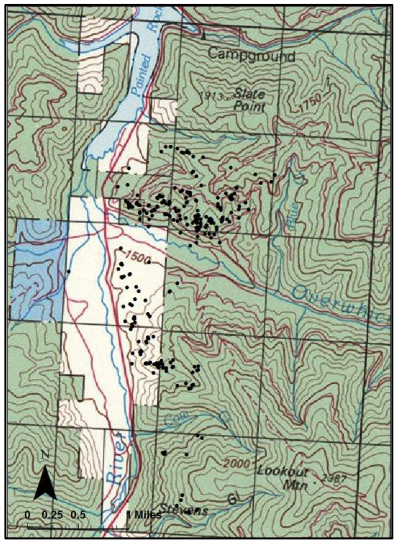
During February 2011, we captured 44 adult female elk and outfitted elk with a radiocollar that collects a GPS location every 2-hours and sends a mortality signal if the collar is inactive for 4-hours. Collars are built to drop-off in mid-January 2012 and location data will be retrieved. During capture, we collected blood samples to determine pregnancy status and screen for exposure to disease. Laboratory results indicated that in the upper West Fork, 57 % (n= 14) of females were pregnant. In the burned area west of HY 93 (within HD250), 100% (n = 6) of females were pregnant. In the East Fork, 96% (n = 23) of females were pregnant. We found no evidence that any elk had been exposed to brucellosis. Animals tested positive for exposure to leptosporosis (77%), para-influenza3 (51%), infectious bovine rhinotracheitis (5%), and bovine respiratory syncytial virus (2%). Disease exposure levels were all within the range of normal for elk in Montana.

We used a portable ultrasound machine to collect measurements used to estimate the level of ingesta-free body fat (IFBF), a metric of maternal nutritional condition. IFBF reflects cumulative energy balance over a relatively long period, in contrast to other indicators such as blood serum or urine chemistry that reflect relatively short term nutritional status. Estimated IFBF in the upper West Fork was 5.4%, the burned area west of HY 93 was 8.8%, and the East Fork was 6.9%. Compared to other elk population in the Rocky Mountains, the burned areas and East Fork elk IFBF was average, and the West Fork elk IFBF was lower than average.

Adult survival and movements have been monitored since capture. Four elk have died and one collar failed shortly after capture. An East Fork elk died of unknown causes on March 10, and wolf predation is suspected. An elk in the West Fork was killed by a mountain lion on March 11. Two older East Fork elk died in early May of natural causes. Cause of death is determined by examining the state of the carcass and predator sign in the area.



Left: Elk movement data collected from capture until the animal died on March 11th. This elk's range was centered around Overwhich Creek.

A 6-year old collared elk killed by a mountain lion on March 11. Puncture wounds on the neck, patterns of consumption, and hair plucking indicate lion predation. Lion tracks and a latrine site were also found at the kill site.

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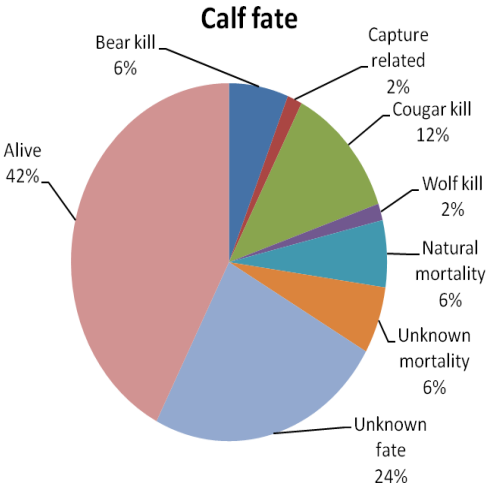
Most upper West Fork elk have moved to higher elevation summering areas in the West Fork watershed, with several venturing near the Idaho border. We have documented movements back and forth between HD 250 and HD 270 throughout late spring and summer. All of the collared females that wintered on private lands southeast of Darby have moved up in elevation and summered on public lands east of their capture locations. As many as eight females have summered east of the continental divide, including over half of the elk captured in the French Basin portion of the East Fork winter range and 2 captured in the southern portions of HD 250. One of these French Basin animals has been located as far northeast in the Big Hole as Fishtrap Creek.

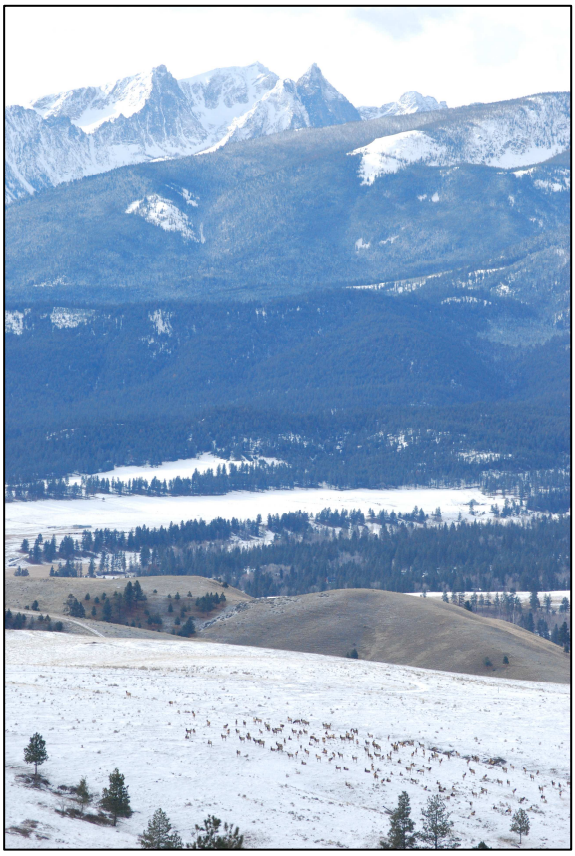
Above: Biologist Craig Jourdonnais attaches an eartag transmitter to a 3 day old calf captured near Dickson

In late-May and early June, we initiated an elk calf survival study with goals of estimating calf survival rates from birth through age 1 and cause-specific mortality in the presence of competing mortality risk. A total of 66 neonatal elk calves were captured in the East Fork and West Fork. Calves were located by searching from the ground and from the air for lone female elk, and then searching the area for the calf. We collected a series of measurements to estimate calf age and weight, and outfitted each calf with a VHF ear tag transmitter. Calves were 1-6 days old at capture, and capture weights ranged from 10.9 to 29.0kg. VHF eartags are equipped with a mortality sensor to alert biologists when the calf has been immobile for 4 hours. A team of biologists have monitored calf survival daily throughout the summer.



Of the initial 66 eartags deployed, 42% remain active on live calves, 24% have been recovered with no sign of a mortality event (potential tag loss), and 33% have been recovered from confirmed mortalities. When a mortality event was detected, biologists collected 75 different pieces of information to determine cause of death, including the state of the carcass, predator sign including tracks, scat or hair for DNA analysis, and the body condition of the dead calf. Mortality sources include lion predation (n=8), bear predation (n=4), natural causes (n=4), wolf predation (n=1), capture related (n=1), and unknown causes (n=4). The low levels of wolf-caused mortality during summer are not surprising because we expect wolf predation to vary seasonally and increase during the winter period. A complete year of calf survival information is needed to assess cause-specific mortality and determine the relative role of natural causes and different predators on calf recruitment. Mortality sources will be confirmed through DNA results (pending at this time), and unknown sources of mortality may also be resolved.

During the second year of this study, we will continue to monitor adult and calf survival and investigate causes of mortality. Twenty-five 6-month old calves will be captured in December to increase the number of calves monitored throughout the winter. Forty adult females will be captured and collared during winter 2011-2012. Neonatal calves will be captured during May-June 2012 and intensive calf survival monitoring will occur during summer 2012. The variation in female body condition and pregnancy rates suggests underlying variations in nutritional conditions may play an important role in elk population dynamics, and we will also be working to develop a vegetation monitoring program during summer 2012. We are fundraising for financial support to continue the calf survival study, and to increase wolf population and lion population monitoring efforts. Estimated wolf, lion, and bear density in the study areas will be related to elk survival rates, and ultimately used to develop a tool that will allow wildlife managers to simulate the effects of various wolf, lion, and bear harvest scenarios on elk population growth. These tools will assist managers in developing wolf, lion, bear and elk management plans that conserve all species at the desired population objectives.



We would like to thank the landowners that have allowed access for elk captures and provided logistical support. We would also like the thank the organizations and individuals that have provided financial support for this project: Ravalli County Sportsman's Association, Montana Bowhunter's Association, Hellgate Hunters and Anglers, Rocky Mountain Elk Foundation, Safari Club International Foundation, Montana Chapter of the Safari Club, the Shikar-Safari International Club, MacEntire-Stennis Foundation (USDA), the Bitterroot and Beaverhead-Deerlodge resource advisory councils (USFS), and private donations from individuals in the community. Funding was also provided by revenues from the sale of Montana hunting and fishing licenses and matching Federal Aid in Wildlife Restoration grants to Montana Fish, Wildlife, and Parks.

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